

## **Air Pollution Trends in Kuala Lumpur Extended Mega Urban Region (KLEMUR), from 2000 to 2015**

Nor Diana Abdul Halim<sup>1\*</sup>, Mohd Talib Latif<sup>1,2</sup> and Ahmad Fariz Mohamed<sup>1</sup>,

<sup>1</sup>Institute for Environment and Development (LESTARI), Universiti Kebangsaan Malaysia,  
43600 Bangi, Selangor, Malaysia

<sup>2</sup>School of Environmental and Natural Resource Sciences, Faculty of Science  
and Technology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor,  
Malaysia

\*Corresponding author

Email: missdianahalim@gmail.com

Urbanization has led Kuala Lumpur Extended Mega-Urban Region (KLEMUR) to become the largest conurbation city in Malaysia. Rapid development in urban region can enhance the air pollutant emissions and cause harmful effects towards human health and ambient air quality. Monitoring the concentration of air pollutants continuously is crucial in maintaining the good air quality of an area. This study attempts to determine long-term trends of air pollution in KLEMUR. Sixteen-year data sets (2000-2015) of major air pollutants ( $O_3$ , CO, NO,  $NO_2$ ,  $NO_x$ ,  $SO_2$  and  $PM_{10}$ ) and meteorological factors (temperature, humidity and wind speed) recorded by the Department of Environment Malaysia were analysed. The statistical analysis, trajectory analysis and bivariate polar plot analysis were performed by using data from eight continuous air quality monitoring stations (Tanjung Malim, Klang, Petaling Jaya, Shah Alam, Nilai, Seremban, Melaka and Bukit Rambai). Diurnal, monthly and annual trends were derived from hourly air pollutant data. The annual mean of  $PM_{10}$  concentration for all stations exceeded the maximum allowable limit of the World Health Organization (WHO) ( $20 \mu g m^{-3}$ ). Only Tanjung Malim station was still below the New Malaysian Air Quality Standard (NMAQS) ( $50 \mu g m^{-3}$ ). The monthly trends showed the air pollutants were higher during the southwest monsoon (June-September). The influence of southwest monsoon winds has led to the peak of  $PM_{10}$  especially during severe haze episodes in 2005 and 2015. Petaling Jaya station had recorded the highest concentration of NO,  $NO_2$ , and  $NO_x$  throughout the period due to the presence of heavy traffic conditions. Although  $SO_2$  showed a downward trend within sixteen years, most of the air pollutants are still peaking up especially in the urban area of Seremban, Nilai and Bukit Rambai. These observations suggest that further reduction of air pollutants should be applied in order to enhance the air quality and to achieve sustainable urban areas.

### **Keywords:**

Air pollution; Rapid urbanization; Meteorological factors; Long-term assessment; Kuala Lumpur Extended Mega-Urban Region (KLEMUR)